

What is claimed is:

- [c01] 1. A method for signal-adaptive noise reduction in digital radiographic images, comprising the steps of:
- obtaining raw x-ray image data of an imaged object;
 - processing the raw x-ray image data to create processed x-ray image data;
 - inputting the raw x-ray image data and the processed x-ray image data to an image processor;
 - developing an intensity modulation image from the raw x-ray image data;
 - deriving a structure-dependent noise filtered image using the processed x-ray image data;
 - performing signal attenuation-dependent blending; and
 - creating a noise-reduced digital x-ray image therefrom.
- [c02] 2. The method of claim 1, wherein the raw x-ray image data represents a detected x-ray signal from an imaged object.
- [c03] 3. The method of claim 1, wherein the processed x-ray image data represents pixel intensity values of the raw x-ray image data after display processing.
- [c04] 4. The method of claim 1, wherein the intensity modulation image represents a predefined weighting function based on absolute detected intensities or digital image signal levels, and includes the effects of imaging system gain.
- [c05] 5. The method of claim 1, wherein deriving the structure-dependent noise filtered image using the processed x-ray image data comprises utilizing structure-dependent noise filtering.
- [c06] 6. The method of claim 1, wherein performing signal attenuation-dependent blending comprises blending together the structure-dependent noise filtered image and the processed x-ray image data by modulating the blending values at each pixel location using the intensity modulation image.

- [c07] 7. The method of claim 1, further comprising:
outputting the noise-reduced digital x-ray image from the image processor.
- [c08] 8. A method for signal-adaptive noise reduction in digital radiographic images, comprising the steps of:
obtaining raw x-ray image data of an imaged object;
processing the raw x-ray image data to create processed x-ray image data;
inputting the processed x-ray image data to an image processor;
developing an intensity modulation image from the processed x-ray image data;
deriving a structure-dependent noise filtered image using the processed x-ray image data;
performing signal attenuation-dependent blending; and
creating a noise-reduced digital x-ray image therefrom.
- [c09] 9. The method of claim 8, wherein the raw x-ray image data represents a detected x-ray signal from an imaged object.
- [c10] 10. The method of claim 8, wherein the processed x-ray image data represents pixel intensity values of the raw x-ray image data after display processing.
- [c11] 11. The method of claim 8, wherein the intensity modulation image represents a predefined weighting function based on absolute processed intensities or digital image signal levels.
- [c12] 12. The method of claim 8, wherein deriving the structure-dependent noise filtered image using the processed x-ray image data comprises utilizing structure-dependent noise filtering.
- [c13] 13. The method of claim 8, wherein performing signal attenuation-dependent blending comprises blending together the structure-dependent noise filtered

image and the processed x-ray image data by modulating the blending values at each pixel location using the intensity modulation image.

[c14] 14. The method of claim 8, further comprising:
 outputting the noise-reduced digital x-ray image from the image processor.

[c15] 15. A method for signal-adaptive noise reduction in digital radiographic images, comprising the steps of:

 obtaining raw x-ray image data of an imaged object;
 processing the raw x-ray image data to create processed x-ray image data;
 inputting the raw x-ray image data and the processed x-ray image data to an image processor;
 developing a first intensity modulation image from the raw x-ray image data;
 developing a second intensity modulation image from the processed x-ray image data;
 deriving a structure-dependent noise filtered image using the processed x-ray image data;
 performing signal attenuation-dependent blending; and
 creating a noise-reduced digital x-ray image therefrom.

[c16] 16. The method of claim 15, wherein the raw x-ray image data represents a detected x-ray signal from an imaged object.

[c17] 17. The method of claim 15, wherein the processed x-ray image data represents pixel intensity values of the raw x-ray image data after display processing.

[c18] 18. The method of claim 15, wherein the first intensity modulation image represents a predefined weighting function based on absolute detected intensities or digital image signal levels, and includes the effects of imaging system gain.

[c19] 19. The method of claim 15, wherein the second intensity modulation image represents a predefined weighting function based on absolute processed intensities or digital image signal levels.

[c20] 20. The method of claim 15, wherein deriving the structure-dependent noise filtered image using the processed x-ray image data comprises utilizing structure-dependent noise filtering.

[c21] 21. The method of claim 15, wherein performing signal attenuation-dependent blending comprises blending together the structure-dependent noise filtered image and the processed x-ray image data by modulating the blending values at each pixel location using the first intensity modulation image and the second intensity modulation image.

[c22] 22. The method of claim 15, further comprising:
outputting the noise-reduced digital x-ray image from the image processor.

[c23] 23. A computer-readable medium encoded with programming for facilitating signal-adaptive noise reduction in digital radiographic images, the programming configured to:

- obtain raw x-ray image data of an imaged object;
- process the raw x-ray image data to create processed x-ray image data;
- input at least one of the raw x-ray image data and the processed x-ray image data to an image processor;
- develop at least one of: a first intensity modulation image from the raw x-ray image data, and a second intensity modulation image from the processed x-ray image data;
- derive a structure-dependent noise filtered image using the processed x-ray image data;
- perform signal attenuation-dependent blending; and
- create a noise-reduced digital x-ray image therefrom.

[c24] 24. The computer-readable medium of claim 23, wherein the raw x-ray image data represents a detected x-ray signal from an imaged object.

[c25] 25. The computer-readable medium of claim 23, wherein the processed x-ray image data represents pixel intensity values of the raw x-ray image data after display processing.

[c26] 26. The computer-readable medium of claim 23, wherein the first intensity modulation image represents a predefined weighting function based on absolute detected intensities or digital image signal levels, and includes the effects of imaging system gain.

[c27] 27. The computer-readable medium of claim 23, wherein the second intensity modulation image represents a predefined weighting function based on absolute processed intensities or digital image signal levels.

[c28] 28. The computer-readable medium of claim 23, wherein the programming derives the structure-dependent noise filtered image using the processed x-ray image data by utilizing structure-dependent noise filtering.

[c29] 29. The computer-readable medium of claim 23, wherein the programming performs signal attenuation-dependent blending by blending together the structure-dependent noise filtered image and the processed x-ray image data by modulating the blending values at each pixel location using at least one of: the first intensity modulation image and the second intensity modulation image.

[c30] 30. The computer-readable medium of claim 23, further comprising programming configured to:
output the noise-reduced digital x-ray image from the image processor.

[c31] 31. A digital radiographic imaging system comprising:
an x-ray source;

an x-ray detector in operative communication with the x-ray source; and
a signal-adaptive noise reduction system in operative communication with the
x-ray detector,

wherein the signal-adaptive noise reduction system comprises programming
configured to:

- obtain raw x-ray image data of an imaged object;
- process the raw x-ray image data to create processed x-ray image data;
- input at least one of the raw x-ray image data and the processed x-ray image
data to an image processor;
- develop at least one of: a first intensity modulation image from the raw x-ray
image data, and a second intensity modulation image from the processed x-ray image
data;
- derive a structure-dependent noise filtered image using the processed x-ray
image data;
- perform signal attenuation-dependent blending; and
- create a noise-reduced digital x-ray image therefrom.

[c32] 32. The digital radiographic imaging system of claim 31, wherein
the programming derives the structure-dependent noise filtered image using the
processed x-ray image data by utilizing structure-dependent noise filtering.

[c33] 33. The digital radiographic imaging system of claim 31, wherein
the programming performs signal attenuation-dependent blending by blending
together the structure-dependent noise filtered image and the processed x-ray image
data by modulating the blending values at each pixel location using at least one of: the
first intensity modulation image and the second intensity modulation image.